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EXAMINER	
PARSONS, THOMAS H	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No.	Applicant(s)	
	10/501,759	MITCHELL ET AL.	
	Examiner	Art Unit	
	THOMAS H. PARSONS	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5,7-20,22-32,37,39-43,45 and 46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5,7,8,10-20,22-26,28-32,37,39-43,45 and 46* is/are rejected.

7)☒ Claim(s) *9 and 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 January 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/17/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

This is in response to the Amendment filed 17 July 2008.

(Previous) DETAILED ACTION

Drawings

1. The drawings **stand** objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

Reference characters "12a" and "13a" as shown in Figure 1.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The objection to Figures 1 and 2 for lacking a legend such as --Prior Art-- because only that which is old is illustrated has been **withdrawn** in view of Applicants' Amendment.

3. The objection to the disclosure because of informalities has been **withdrawn** in view of Applicants' Amendment.

Claim Objections

4. The objection to claim 41 because of minor informalities has been **withdrawn** in view of Applicants' Amendment.

Response to Arguments

5. Applicant's arguments, see pages 17-19, filed 17 July 2008, with respect to claims 1-7, 10-25, 28-40 and 42-49 have been fully considered and are persuasive. The rejections of the claims have been **withdrawn.**

(New) DETAILED ACTION

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 5 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites "5. (Currently Amended) A fuel cell according to claim 4..." It is unclear as to which claim is being further limited as claim 4 has been canceled.

Claim 7 recites "5. (Currently Amended) A fuel cell according to claim 3..." It is unclear as to which claim is being further limited as claim 3 has been canceled.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1, 5, 7-8, 10-11, 25-26, 28-30, 37, 39, and 41-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Trocciola et al. (US 4,755,439)

Claim 1: Trocciola et al. in Figure 1 disclose a fuel cell system comprising:

an anode (4), a cathode (6), and an ion exchange membrane (26) between the anode and the cathode;

a fuel delivery conduit comprising:

a fluid flow field plate forming part of the anode, having a fluid flow channel extending through the fluid flow plate;

a fuel delivery inlet (12) coupled to one end of the fluid flow channel;

a fuel delivery outlet (14) coupled another end of the fluid flow channel; and

a fluid flow regulator (20) for controllably varying a quantity of fuel delivered to a mixing point in the fuel delivery inlet; and

a recirculation conduit (18) extending between the fuel delivery outlet (14) and the mixing point, wherein the mixing point comprises a reaction chamber (28) for reacting fuel, and a pre- mixing chamber (junction pint where 18 and 12 meet), the mixing point for mixing fuel from the fluid flow regulator with oxidant species from the recirculation conduit for supplying fuel from a fuel source to an active surface. See col. 3: 20-col. 4: 42).

Claim 5: Trocciola et al. further disclose that the reaction chamber (28) includes a catalyst material (33).

Claims 7 and 25: Trocciola et al. further disclose recirculation conduit is switchably connected to the fuel delivery outlet by way of a two way valve (20).

Claim 8: Trocciola et al. in Figures 1 and 2 disclose a fuel cell system comprising:

an anode (4);

a cathode (6);

an ion exchange membrane (8) between the anode and the cathode, the ion exchange membrane comprising:

a fuel delivery conduit (12) for supplying fuel from a fuel source to an active surface area of the anode; and

means (33) for effecting a controlled combustion of fuel and oxidant species within the fuel delivery conduit; and

detection means (16) for detecting a level of oxidant species present in at least part of the fuel delivery conduit. See col. 3: 20-col. 4: 42.

Claim 10, 28 and 42: Trocciola et al. in Figure 1 further disclose a control means (20) for switching the fuel cell between a normal mode of operation and a recirculation mode (col. 3: 37-39).

Claim 11, 29 and 43: The rejection of claim 11 is as set forth above in claim 10.

Claim 26: Trocciola et al. in Figure 1 disclose a fuel cell system including:

a fuel cell (2) having an anode (4), a cathode (6), and an ion exchange membrane (8) therebetween (see col. 1: 10-19);

a fuel delivery conduit comprising:

a fluid flow field plate forming part of the anode (14), having a fluid flow channel extending therethrough;

a fuel delivery inlet (12) coupled to one end of the fluid flow channel; and a fuel delivery outlet (14) coupled another end of the fluid flow channel (Figures 1 and 2 show fluid flowing into and out of the anode);

a recirculation conduit (18) extending between the fuel delivery outlet and a mixing point in the fuel delivery inlet; and

means (16) for detecting a level of oxidant species present in at least part of the fuel delivery conduit. See col. 3: 20-col. 4: 42).

Claim 30: Trocciola et al. in Figure 1disclose a fuel cell system including:

a fuel cell (2) having an anode (4), a cathode (6), and an ion exchange membrane (8) therebetween (see col. 1: 10-19);

a fuel delivery conduit (12) coupled to the anode comprising:

a reaction chamber (33);

a fuel supply inlet coupled to the reaction chamber;

an oxidant supply coupled to the reaction chamber; and

a reaction chamber outlet connected to the anode (via 18);

a recirculation conduit (18); and

wherein the reaction chamber is configured to mix fuel from the fuel supply inlet with oxidant species from the recirculation conduit.

See abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

The recitation "the reaction chamber being adapted so that at least a part of the fuel supply delivered thereto to is reacted with the oxidant supplied thereto to precondition the fuel being delivered to the anode" has been considered, and construed as function language that adds no additional structural limitation to the fuel. However, because the reaction chamber of Tajima is the same as that instantly disclosed it appears capable of providing the claimed function.

Claim 37: Trocciola et al. in Figures 1 and 2 a method of operating a fuel cell (12 having an anode (4), a cathode (6), and an ion exchange membrane (8) therebetween, comprising the steps of:

supplying fuel from a fuel source to an active surface area of the anode (4) by way of a fuel delivery conduit (12);

recirculating fluid (via 18) within the fluid deliver conduit to a mixing point upstream of the active surface area of the anode; and

effecting a controlled combustion (via 33) of fuel and oxidant species within the fuel delivery conduit. See abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

Further, because the structure of the fuel cell system of Tajima is structurally the same as that instantly disclosed for carry out the claimed method, the fuel cell system would inherently perform the claimed method.

Claim 39: Trocciola et al. in Figure 2 disclose consuming oxidant species at the mixing point, in a reaction chamber (45).

Claim 41: Trocciola et al. in Figures 1 and 2 disclose a method of operating a fuel cell system (2) comprising an anode (4), a cathode (6), and an ion exchange membrane (8) between the anode and the cathode, the method comprising:

supplying fuel from a fuel source to an active surface area of the anode by way of a fuel delivery conduit (12);

effecting a controlled combustion of fuel and oxidant within the fuel delivery conduit (via 33) and

detecting a level of oxidant species (via 16) present in at least part of the fuel delivery conduit. See abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 12-20, 22-24, 31-32, 40, 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Trocciola et al. as applied to claim 1 above, and further in view of JP5-89899.

Trocciola et al. are as applied, argued, and disclosed above, and incorporated herein.

Claim 12: Trocciola et al. do not disclose an oxidant supply conduit extending from an oxidant supply to a mixing point in the fuel delivery inlet.

JP '899 discloses an oxidant supply conduit (23) extending from an oxidant supply to a mixing point (2) in the fuel delivery inlet.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell system of Trocciola et al. because JP '899 discloses an oxidant supply conduit (23) extending from an oxidant supply to a mixing point (2)

in the fuel delivery inlet that would have provided a means to facilitate the uniform heating of the fuel cell at startup thereby improving the overall operation and performance of the fuel cell.

Claim 13: The rejection is as set forth above in claim 12 wherein JP '899 further discloses an oxidant flow regulator (33).

Claim 14: The rejection is as set forth above in claim 12 wherein JP '899 further discloses that the oxidant flow regulator comprises a valve (33) coupling the oxidant supply conduit to a cathode oxidant delivery conduit.

Claim 15: Trocciola et al. disclose that the mixing point (28) is a reaction chamber.

Claim 16: Trocciola et al. disclose that the reaction chamber includes a catalyst material (33).

Claim 17: Trocciola et al. disclose a means (33) for effecting a controlled combustion of fuel and oxidant species within a cathode fluid delivery conduit.

Claim 18: Trocciola et al. in Figure 1 disclose a fluid flow field plate forming part of the cathode (6), the fluid flow field plate comprising a fluid flow channel extending therethrough;

an oxidant delivery inlet (24) coupled to one end of the cathode fluid flow channel; and an exhaust outlet (26) coupled to another end of the cathode fluid flow channel. One skilled in the art would know that a convention fuel cell comprises the claimed fluid flow field plate and fluid flow channel.

Claim 19: The rejection is as set forth above in claim 12 wherein further JP '899 discloses a fuel supply conduit (22) extending from a fuel supply (21) to a mixing point (2) in the oxidant delivery inlet.

Claims 20 and 23: Trocciola et al. in Figure 2 further disclose that the mixing point comprises a reaction chamber (33). The recitation "for reacting fuel from said fuel supply conduit with oxidant species from said oxidant supply" has been considered, and construed as function language that adds no additional structural limitation to the fuel. However, because the reaction chamber of Tajima is the same as that instantly disclosed it appears capable of providing the claimed function.

Claims 22 and 40: Trocciola et al. do not disclose a fluid flow regulator coupled to the mixing point.

JP '899 discloses a fluid flow regulator coupled to the mixing point.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell of Trocciola et al. by incorporating the fluid flow regulator of JP '899 because JP '899 discloses a flow regulator that would have provided a means to control the flow of fuel to the mixing point thereby improving the overall performance of the fuel cell.

Claim 24: Trocciola et al. in Figure 1 disclose a pre-mixing point (i.e. the junction between the fuel (vial 12) and the oxidant species from the recirculation conduit).

Claims 31, 32, 45 and 46: Trocciola et al. do not disclose a control means (41, 43) for controllably varying the flow rate of one or both of the fuel and oxidant.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell of Trocciola et al. by incorporating the control means of JP '899 because JP '899 discloses a control means that would have provided a means to

control the flow of fuel to the mixing point thereby improving the overall performance of the fuel cell.

Allowable Subject Matter

12. Claims 9 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Indicating Allowable Subject Matter

A search of the prior art references of record failed to teach or suggest what is instantly claimed, in particular,

A fuel cell comprising detection means comprises means for testing an open circuit voltage across the anode and cathode of the fuel cell (*claims 9 and 27*).

Trocciola et al. in Figure 1 disclose an oxygen sensor disposed in the inlet line to continuously monitor the percent oxygen contaminant in the fuel gas entering the stack. A valve and pump are controlled by the sensor so tha5 when the sensor detects an oxygen level of more than a predetermined value, the valve and pump are activated to recirculate anode exhaust back to the inlet line.

There is no teaching or suggestion in Trocciola et al. to a detecting means for detecting a level of oxidant species wherein the detection means comprises means for testing an open circuit voltage across the anode and cathode of the fuel cell.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS H. PARSONS whose telephone number is (571)272-1290. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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